

# LAWRENCE LIVERMORE REPORT

**A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, March 21-25, 2011**

## A model for emergency response



In an event of an atmospheric release from a volcanic eruption, earthquake, explosives or fire, the Laboratory's National Atmospheric Release Advisory Center (NARAC) has been on call.

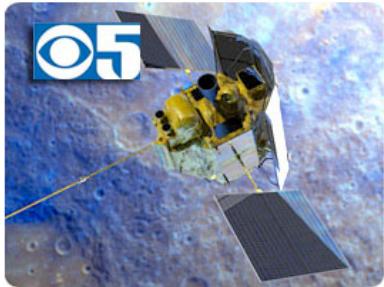
NARAC can deliver an initial prediction for almost any kind of release in five to 15 minutes; it responds to roughly 25 events in a typical year (and simulates 10,000 more). Right now, NARAC is leveraging its computing capabilities to analyze a variety of situations -- both real-world and speculative -- to support the U.S. response to events in Japan.

Modeling an atmospheric release is no easy task. Crucial information such as the type of material released, its quantity and source and detailed wind and weather data are necessary to accurately replicate conditions in the atmosphere.

NARAC scientists have been working around the clock since March 11 monitoring the air space over Japan.

To read more, go to the [Web](#).

## MESSENGER ready to deliver



## **Mercury MESSENGER**

LLNL physicist Morgan Burks knows about patience. He has waited seven years for his gamma-ray spectrometer on board the Mercury MESSENGER to get to the planet closest to the sun.

When MESSENGER went into orbit around Mercury last week, Burks and his team were on the edge of their seats.

During 2002 and 2003, the LLNL scientists developed a germanium-based gamma ray spectrometer that has been winging its way aboard the Mercury MESSENGER (short for MErcury Surface, Space Environment, GEochemistry and Ranging) for the past six-and-a-half years.

MESSENGER started a highly elliptical orbit of Mercury at 6 p.m. (Pacific Daylight Time) last Thursday, coming as close as 120 miles to the planet and as far as 9,000 miles away. It is the first spacecraft to orbit Mercury, circling the planet every 12 hours for one year.

Livermore's gamma ray spectrometer will help determine the elemental and mineral composition of Mercury's surface.

To see the news report, click [here](#).

## **Scanning for terrorist materials**



**A VeriTainer Corp. employee is shown at a port where the crane is in operation.**

By 2012, 100 percent of containers must be screened for potential weapons material, according to legislation passed in 2007.

With less than 12 months to go, only about 3 to 4 percent of containers get truly scanned.

Enter Joe, Lawrence and John Alioto, who run a company named VeriTainer, which has developed new scanning technology to check the more than 12 million giant shipping containers that come into U.S. docks every year for hidden radiological or nuclear material.

VeriTainer's technology has led to testing and experimentation agreements with the Laboratory and the Department of Energy. The system has been tried at the Oakland port and several others. Laboratory researchers are working to refine and enhance VeriTainer's patented crane mounted scanning (CMS) technology.

To read more, go to the [Web](#).

### **Striving for a fusion energy future**



**Inside the NIF target chamber.**

The biggest and most alluring development in alternative energy options is nuclear fusion.

And the Lab's National Ignition Facility is on its way to achieving it by using powerful lasers to force pellets of fusion fuel to implode, creating the same energy that powers the sun.

NIF will provide data for national security as well as carry out fundamental research in astrophysics and plasma physics. The facility also will aim to fuse the hydrogen isotopes deuterium and tritium to demonstrate the feasibility of laser-based fusion for energy production.

Fusion experiments are set to begin next year.

To read more, go to the [Web](#).

### **Alameda County detects a Lab winner**



**Alameda County Supervisor Keith Carson, LLNL molecular biologist Crystal Jaing and Alameda County Administrator Susan Muranishi.**

The Laboratory's Crystal Jaing is a key developer of a device that could assist in detecting bioterrorism attacks, diagnosing diseases and checking product safety.

For her achievements, the molecular biologist has been inducted into the Alameda County Women's Hall of Fame. One of 11 Alameda County women inducted, Jaing was recognized for her work in science.

Jaing is a co-developer of the Lawrence Livermore Microbial Detection Array (LLMDA), which could enable law enforcement, medical professionals and others to detect within 24 hours any virus or bacteria included among the array's probes.

Developed between October 2007 and February 2008, the LLMDA detects viruses and bacteria with the use of 388,000 probes that fit in a checkerboard pattern in the middle of a one-inch wide, three-inch-long glass slide. The current operational version of the LLMDA contains probes that can detect more than 2,000 viruses and about 900 bacteria.

To read more, go to the [Web](#).

## All's fair in science and engineering



**Nikky Cherukuthota and Jasmine Sandhu of Gale Ranch Middle School in San Ramon, with their project, "Water Distillation by Solar Energy."**

This week, 413 of the best and brightest future scientists discussed their projects with seasoned scientists and engineers and competed for cash and other prizes at the 15th annual Tri-Valley Science and Engineering Fair, sponsored by LLNL at the Robert Livermore Community Center.

This year saw a 30 percent increase in participants over last year. Students from 22 schools in Danville, Dublin, Livermore, Pleasanton, San Ramon and Sunol displayed 262 projects in such categories as chemistry, computer science, engineering, physical science and medicine and health. Judging took place Wednesday with an awards ceremony in the evening.

Sweepstakes winners were announced and 120 special awards were given in the form of scholarships, cash prizes and other nonmonetary recognition from scientific, professional, industrial, education and government organizations.

To read more, go to the [Web](#).

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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